Frequent Sports Injuries and Rehabilitation of Elite Para-athletes

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중앙보훈병원 재활센터

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1-1. Texts (1)

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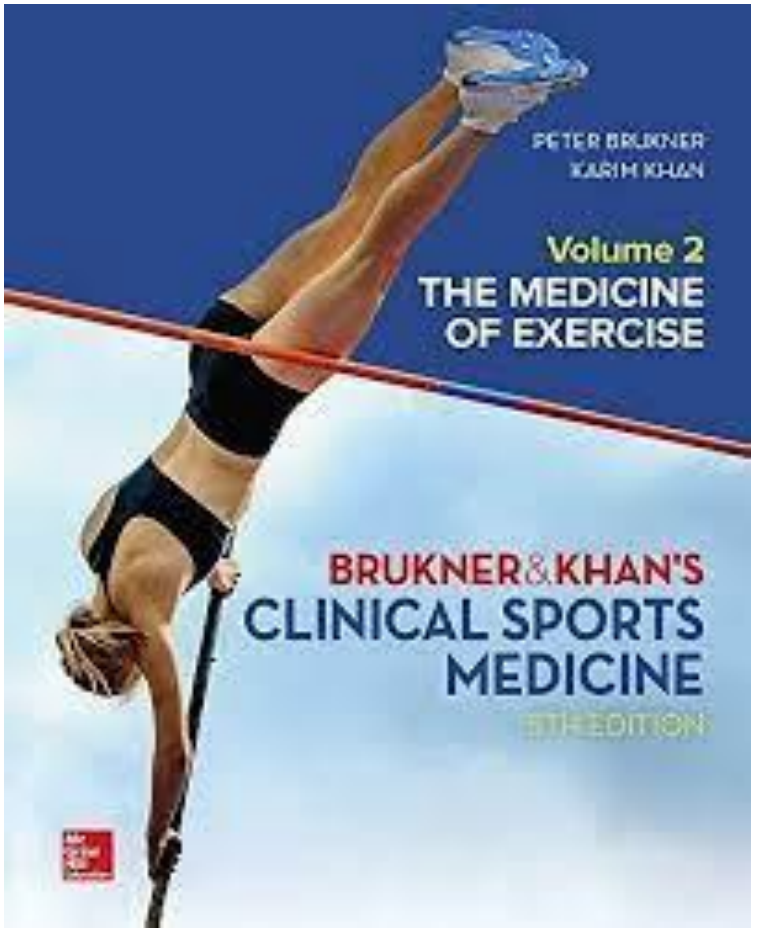

1-1. Texts (2)

Frequent Sports Injuries in Paralympics

- Common summer sport injuries

1) Data from 2016 Rio summer Paralympic games
2) High incidence of pre-competition injury
3) Clinicians must be prepared to address injuries even prior to the start of competition
4) Para-athlete injury varies according to sport
5) Football 5-a-side repeatedly showing the highest incidence of injury

1-1. Texts (3)

Frequent Sports Injuries in Paralympics

- Overuse shoulder injuries

1) Greater proportion of injuries in Paralympic more than Olympic

2) Highest risk of injury for degenerative shoulder pathologies in w/c users

   ✓ Weight-bearing stress during daily mobility as well as sport

   ✓ Shoulder stabilization alteration induced by scoliosis, poor seating position and muscle imbalnce

   ✓ Specific throwing disciplines of shot-put, discus and javelin

1-1. Texts (4)

- Reducing the load on an injured shoulder contributes to loss of ADL
- Prevention should include
    1) Progression for training loads
    2) Equipment that is fitted correctly and well maintained
    3) Strengthening and stabilization of scapula and rotator cuff
    4) Flexibility-focusing on potentially tight pectoralis and saclene muscles
    5) Early reporting and assessment of injuries

1-1. Texts (5)

Frequent Sports Injuries in Paralympics

- Common winter sport injuries
  - The incidence of injury only first documented at Sochi 2014
  - Incidence rate (IR) of injury number/1000 athlete days
- IR of Sochi Winter Paralympic (26.5) was higher than
  - 7.8 of Sochi Winter Olympic
  - 12.7 of London Summer Paralympic
  - higher risk sports of alpine ski and snowboard
  - Colder environmental conditions

1-1. Texts (6)

Frequent Sports Injuries in Paralympics

- Alpine skiing
  - Ambulatory athletes are at risk of the usual skiing injuries
  - Forceful impact landing on the out-trigger : wrist fracture or shoulder injury

•Para ice hockery

  - Injuries occur btw players, stick or puck
  - Lower bone mass of SCI athletes : susceptible to fracture
  - Lowering the risk by protective wear changes and regulations regarding sled height

•Wheelchair curling

  - Although susceptible to sports-related illness
  - Typically not associated injury

1-2. Paralympic epidemiology (1)

Frequent Sports Injuries in Paralympics

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High incidence of injury at the Sochi 2014 Winter Paralympic Games: a prospective cohort study of 6564 athlete days

W Derman,[1,2,3] M P Schwellnus,[2,3,4] E Jordaan,[5] P Runciman,[1] P Van de Vliet,[6] C Blauwet,[7] N Webborn,[8] S Willick,[9] J Stomphorst[10]

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ABSTRACT

Objective To describe the epidemiology of injuries at the Sochi 2014 Winter Paralympic Games.

Methods A total of 547 athletes from 45 countries were monitored daily for 12 days during the Sochi 2014 Winter Paralympic Games (6564 athlete days). Daily injury data were obtained from teams with their own medical support (32 teams, 510 athletes) and teams

from the able-bodied sport to accommodate for the athletes' impairment type, resulting in specific rule and regulation changes within the sports.[4] The sport of snowboarding was introduced for the first time at the Sochi Games and has been adapted from the able-bodied version of the sport where a group of four athletes proceed down the course at the same time to a design where a single athlete

1-2. Paralympic epidemiology (2)

Frequent Sports Injuries in Paralympics

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High precompetition injury rate dominates the injury profile at the Rio 2016 Summer Paralympic Games: a prospective cohort study of 51 198 athlete days

Wayne Derman,[1,2] Phoebe Runciman,[1,2] Martin Schwellnus,[2,3] Esme Jordaan,[4] Cheri Blauwet,[5] Nick Webborn,[6] Jan Lexell,[7,8,9] Peter van de Vliet,[10] Yetsa Tuakli-Wosornu,[11] James Kissick,[12] Jaap Stomphorst[13]

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ABSTRACT

Objectives To describe the incidence of injury in the precompetition and competition periods of the Rio 2016 Summer Paralympic Games.

Methods A total of 3657 athletes from 78 countries, representing 83.4% of all athletes at the Games,

for the eventual determination of the success of implemented prevention strategies.[9 10] The first large prospective study of injury epidemiology in athletes with impairment, that expressed injury rates and injury proportions per 1000 athlete days, was reported following the London 2012 Summer

1-2. Paralympic epidemiology (3)

Frequent Sports Injuries in Paralympics

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Original article

High incidence of injuries at the Pyeongchang 2018 Paralympic Winter Games: a prospective cohort study of 6804 athlete days

Wayne Derman ,[1,2] Phoebe Runciman,[1,2] Esme Jordaan,[3,4] Martin Schwellnus ,[5,6] Cheri Blauwet,[7] Nick Webborn,[8] Jan Lexell,[9] Peter van de Vliet,[10] James Kissick,[11] Jaap Stomphorst,[12] Young-Hee Lee,[13] Keun-Suh Kim[14]

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ABSTRACT

Objective To describe the epidemiology of sports injury at the Pyeongchang 2018 Paralympic Winter Games.

Methods 567 athletes from 49 countries were monitored daily for 12 days over the Pyeongchang 2018 Paralympic Winter Games (6804 athlete days). Injury data were obtained daily from teams with their own

of a Paralympic Games and expressed per 1000 athlete days. The overall IR of the 12-day Sochi 2014 Paralympic Winter Games was 26.5 injuries per 1000 athlete days (95% CI 22.7 to 30.8).[4] The combined sports of para alpine skiing and para snowboard (a subdiscipline of para alpine skiing at the Sochi Games) had a higher rate of injury (IR of

1-2. Paralympic epidemiology (4)

Frequent Sports Injuries in Paralympics

Table 2 Incidence of injury by sport for athletes competing at the Pyeongchang 2018 Paralympic Winter Games

Sport	Total number of injuries	Number of athletes with an injury	Total number of athletes competing	Total number of athlete days	Percentage of athletes with an injury (%)	Injury incidence rate: injuries/1000 athlete days (95% CI)
All	142	112	567	6804	19.8	20.9 (17.4 to 25.0)
Para snowboard	35	24	72	864	33.3	40.5 (28.5 to 57.5)*
Para alpine skiing	39	30	141	1692	21.3	23.1 (16.5 to 32.1)
Para ice hockey	37	29	135	1620	21.5	22.8 (16.2 to 32.1)
Para Nordic skiing	26	24	159	1908	15.1	13.6 (9.1 to 20.5)
Wheelchair curling	5	5	60	720	8.3	6.9 (2.7 to 17.6)†

*Higher than all other sport categories ($p<0.02$).
‡Lower than para snowboard, para alpine skiing and para ice hockey but not para Nordic skiing ($p<0.01$).

Table 4 Incidence of injury in the precompetition and competition periods for athletes competing at the Pyeongchang 2018 Paralympic Winter Games

Period	Total number of injuries	Number of athletes with an injury	Total number of athletes competing	Total number of athlete days	Percentage of athletes with an injury (%)	Injury incidence rate: injuries/1000 athlete days (95% CI)
All	142	112	567	6804	19.8	20.9 (17.4 to 25.0)
Precompetition	33	31	567	1701	5.5	19.4 (13.6 to 27.6)
Competition	109	95	567	5103	16.8	21.4 (17.4 to 26.3)

1-2. Paralympic epidemiology (5)

Frequent Sports Injuries in Paralympics

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Table 5 Incidence of injury in each anatomical area for athletes competing at the Pyeongchang 2018 Paralympic Winter Games

Anatomical area	Total number of injuries	Number of athletes with an injury	Percentage of athletes with an injury (%)	Injury incidence rate: injuries/1000 athlete days (95% CI)
All	142	112	19.8	20.9 (17.4 to 25.0)
Upper limb	54	52	9.2	7.9 (6.1 to 10.3)
Shoulder/arm/elbow	39	38	6.7	5.7 (4.2 to 7.8)
Wrist/hand/finger	15	15	2.6	2.2 (1.3 to 3.6)
*Lower limb**	48	43	7.6	7.1 (5.2 to 9.5)
Knee	11	10	1.8	1.6 (0.9 to 3.1)
Ankle/foot/toe	13	12	2.1	1.9 (1.1 to 3.4)
Lower leg	7	7	1.2	1.0 (0.5 to 2.1)
Thigh/stump	10	10	1.8	1.5 (0.8 to 2.7)
Hip/groin/pelvis	7	7	1.2	1.0 (0.4 to 2.4)
Head/face/neck†‡	29	27	4.8	4.3 (2.9 to 6.2)
Spine	6	6	1.1	0.9 (0.4 to 2.0)
Chest/trunk/abdomen	5	5	0.9	0.7 (0.3 to 1.8)

Table 7 A description of the impairment types of the 93 athletes with an injury on the WEB-IISS at the Pyeongchang 2018 Paralympic Winter Games

Impairment type	Number of athletes with an injury	Percentage of injured athletes in each impairment type (%)
All	93	100
Limb deficiency (amputation, dysmelia and congenital deformity)	50	53.8
Spinal cord injury	25	26.9
Visual impairment	8	8.6
Central neurologic injury (cerebral palsy, traumatic brain injury, stroke and other neurological impairments)	6	6.5
Les autres	0	0
Unknown	4	4.3

WEB-IISS, web-based injury and injury surveillance system.

1-3. Our study (1)

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Original Article

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Shoulder Disease Patterns of the Wheelchair Athletes of Table-Tennis and Archery: A Pilot Study

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1-1. Our study (2)

Table 1. Variables for each group of athletes and the univariate comparison between the table-tennis group and the archery group

Variable	Table-tennis group (n=19)	Archery group (n=16)	p-value
Age (yr)	49.26±9.05	45.56±12.00	0.306
Male	13 (68.4)	11 (68.8)	0.636
Dominant hand (right)	17 (89.5)	16 (100)	0.287
Disability lesion			0.370
SCI	16 (84.2)	15 (93.8)	
Amputation	3 (15.8)	-	
Polio	-	1 (6.3)	
W/C usage duration (yr)	26.68±9.86	23.81±11.77	0.437
Career as players (yr)	17.37±8.19	12.00±11.14	0.110
Weekly training times (hr)	22.42±9.74	27.19±9.52	0.154
WUSPI (points)	44.42±22.44	54.69±25.00	0.209

Values are presented as mean±standard deviation or number of cases (%).
SCI, spinal cord injury; W/C, wheelchair; WUSPI, Wheelchair User's Shoulder Pain Index.

1-1. Our study (3)

Frequent Sports Injuries in Paralympics

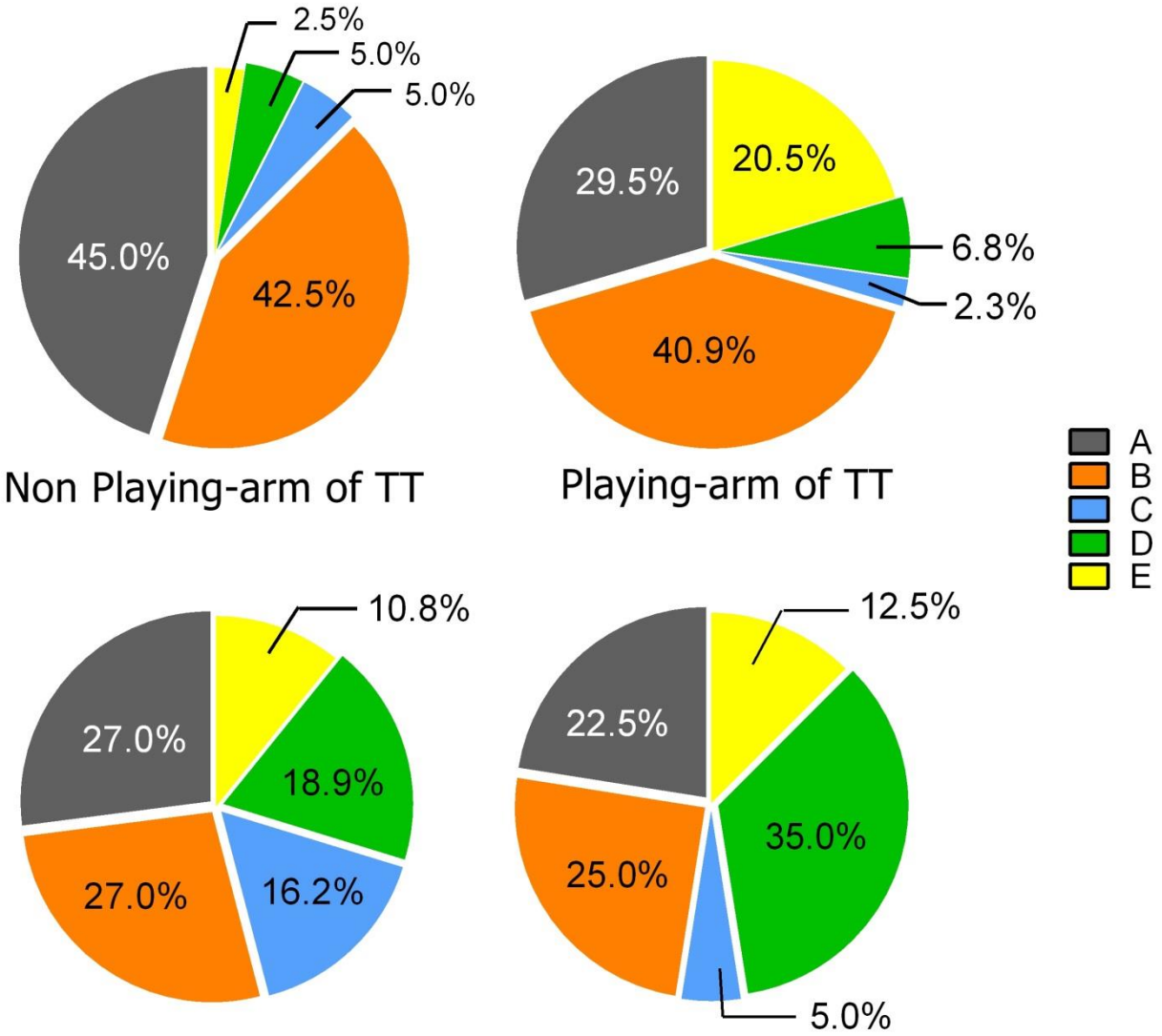


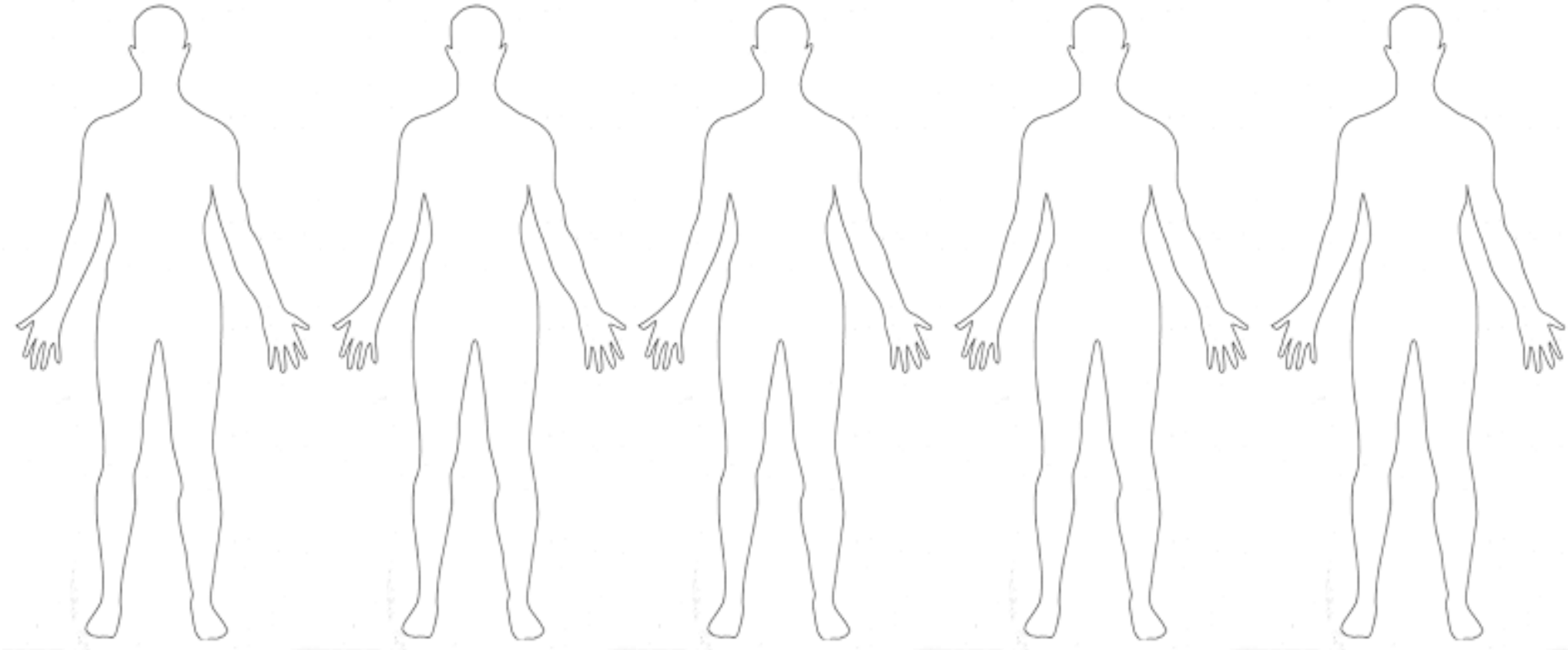
Fig. 1. Pattern of shoulder diseases was compared for the dominant side or not, and between the group of wheelchair table-tennis (TT) and archery (AR). The five diseases for the shoulder, in order with counter-clockwise direction, were 'A' subscapularis tendinopathy, 'B' supraspinatus tendinopathy, 'C' infraspinatus tendinopathy, 'D' biceps long head tendinopathy, and 'E' subacromial-subdeltoid bursitis. *$p<0.05$ by chi-square test, as compared with non-playing arm of TT.

2-1. Organization

- Reduction in injuries was reported in the sport of para alpine skiing
  - Sochi 2014 Games (IR of 43.8) => Pyeongchang 2018 Games (IR of 23.1)
- Improved environmental conditions
  - mean temperature : Pyeongchang of −2℃ vs. Sochi of 9℃
- Interventions made by the IPC and World Para Alpine Skiing federation
  - redesigning the course
  - increasing the number of training runs
  - having the ability to change event start times
  - the development of a snow contingency plan

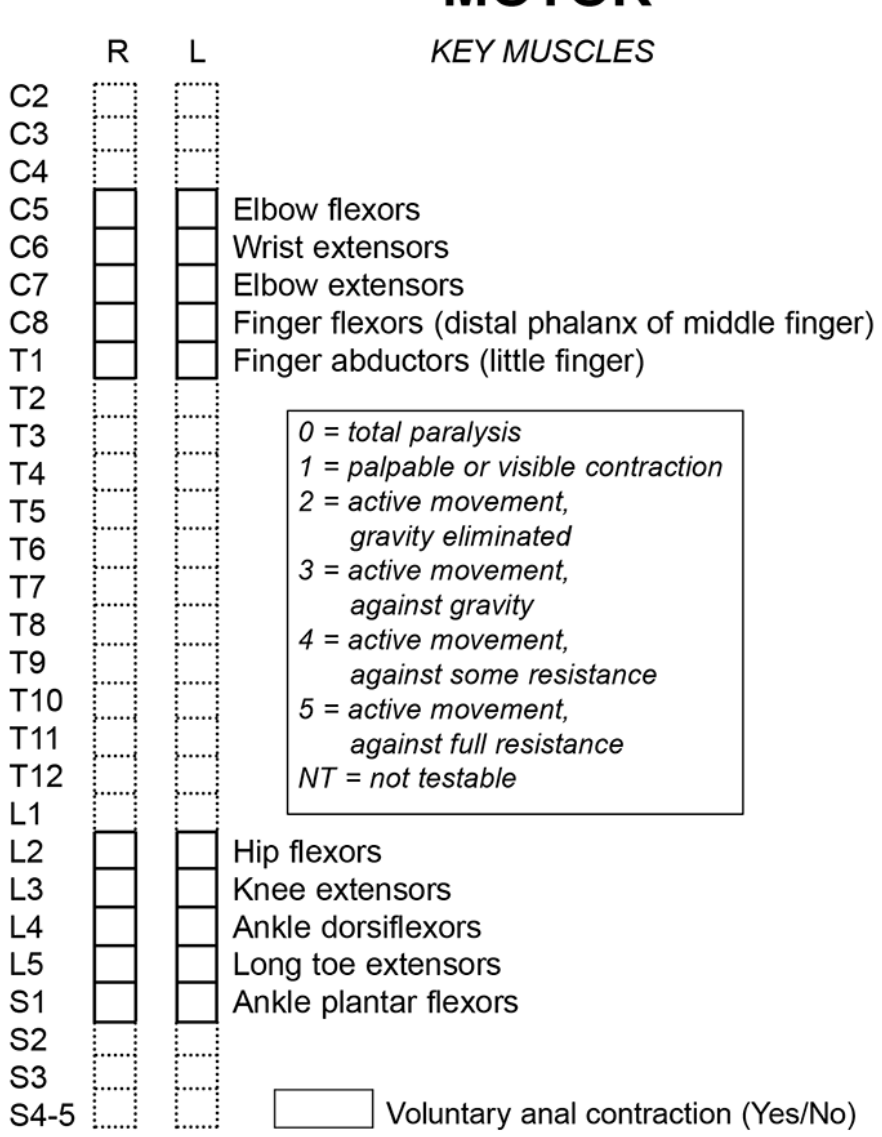
2-1. Classification (1)

- Para table tennis : total 10 classes
- 5 classes of standing



2-1. Classification (2)

- 5 classes of sitting



2-1. Training (1)

- Case by Case
- Personal training for skill
  - Span
  - Speed
  - Spin
- Strategy

2-1. Training (2)

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Pages 685–692

A multistage field test of wheelchair users for evaluation of fitness and prediction of peak oxygen consumption

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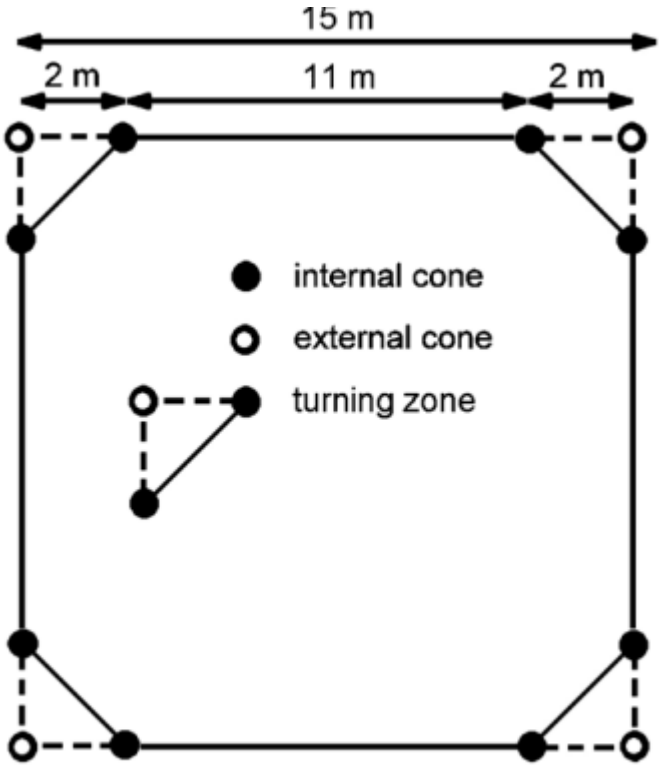

Figure 1.
Illustration of octagonal track used for multistage field test (MFT).

Take Home massage

- Paralympic epidemiology
- No classification, No competition
- Multidisciplinary approach by committee, organization, team & personal athlete for injury prevention
- pre-competition care
- Case by case training
- Optimized strategy

Thanks for your attention ~ !